

REMARKS

Indication of Allowable Subject Matter

Applicant greatly appreciates the Examiner's indication that claims 3, 6, 9, and 12 define allowable subject matter, and indeed would be allowed if rewritten in independent form. However, for at least the reasons set forth herein, Applicant believes original independent claims 1 and 7 are allowable. Accordingly, no amendments have been made in this response and claims 1-14 remain pending. Reconsideration of the present application is respectfully requested.

Claim Status

Claims 1, 2, 7 and 8 stand rejected under 35 U.S.C. §103 as allegedly being unpatentable over *Azadet* (U.S. Pub. No. 2002/0083396) in view of *Hatakeyama* (U.S. Patent No. 5,923,713). Claims 4, 5, 10 and 11 stand rejected under 35 U.S.C. §103 as allegedly being unpatentable over *Azadet* (U.S. Pub. No. 2002/0083396) and *Hatakeyama* (U.S. Patent No. 5,923,713) in view of *Ghosh et al.* (U.S. Pub. No. 2006/0114981). Claims 13 and 14 stand rejected under 35 U.S.C. §103 as allegedly being unpatentable over *Azadet* (U.S. Pub. No. 2002/0083396) and *Hatakeyama* (U.S. Patent No. 5,923,713) in view of *Ahmed et al.* (U.S. Patent No. 6,883,021).

Response To Rejection of Independent Claims 1&7

Applicant respectfully traverses the rejections of amended claims 1 and 7 on the grounds that the teachings of *Azadet*, *Hatakeyama*, *Ghosh et al.* and *Ahmed et al.* do not suggest all features of the claimed invention to one of ordinary skill in the art.

In order for a claim to be properly rejected under 35 U.S.C. §103, the teachings of the prior art reference must suggest all features of the claimed invention to one of ordinary skill in the art. *See, e.g., In re Dow Chemical*, 837 F.2d 469, 5 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1988); *In re Keller*, 642 F.2d 413, 208 U.S.P.Q. 871, 881 (C.C.P.A. 1981).

Independent claim 1 recites:

1. A survivor path decoding apparatus for a Viterbi decoder with a constraint length of K , comprising:
 - a best survivor unit for receiving path metrics of 2^{K-2} local winner states from which a best state is selected every L iterations, wherein said local winner states are chosen from 2^{K-2} pairs of odd and even states, respectively; and
 - a survivor memory comprising:
 - a register-exchange network for receiving decision bits of 2^{K-1} states and generating decision vectors of survivor paths leading to said 2^{K-1} states at instant i according to said decision bits of said 2^{K-1} states from instant $i-L$ to instant i , wherein said 2^{K-1} states are divided into said 2^{K-2} pairs of odd and even states, said decision vectors of said 2^{K-1} states are output every L iterations, and each of said decision vectors has a length of L bits; and**
 - a trace-back unit for storing said decision vectors of said 2^{K-1} states and finding a global survivor path sequence by following said decision vectors back from the best state at instant $i-L$, such that L decoded bits are output every L iterations.**

(*Emphasis Added*). Independent claim 1 patently defines over the cited art for at least the reason that the cited art fails to disclose the features emphasized above.

Independent claim 7 recites:

7. A rate $1/n$ Viterbi decoder with a constraint length of K comprising:
 - a branch metric generator for computing a plurality of branch metrics, each of which is a distance between a corresponding branch label and a currently received data symbol including n decision metrics;
 - an add-compare-select module, responsive to said branch metrics, for generating decision bits of 2^{K-1} states along with path metrics of

- 2^{K-2} local winner states, wherein said 2^{K-2} local winner states are selected from 2^{K-2} pairs of odd and even states, respectively, and said 2^{K-1} states are divided into said 2^{K-2} pairs of odd and even states;
- a best survivor unit for receiving said path metrics of said 2^{K-2} local winner states from said add-compare-select module and selecting a best state from among said 2^{K-2} local winner states every L iterations; and
- a survivor memory comprising:
 - a register-exchange network for receiving said decision bits of said 2^{K-1} states from said add-compare-select module and generating decision vectors of survivor paths leading to said 2^{K-1} states at instant i according to said decision bits of said 2^{K-1} states from instant $i-L$ to instant i , wherein said decision vectors of said 2^{K-1} states are output every L iterations and each of said decision vectors has a length of L bits; and**
 - a trace-back unit for storing said decision vectors of said 2^{K-1} states and finding a global survivor path sequence by following said decision vectors back from the best state at instant $i-L$, such that L decoded bits are output every L iterations.**

(*Emphasis Added*). Independent claim 7 patently defines over the cited art for at least the reason that the cited art fails to disclose the features emphasized above.

Specifically, each of Independent claims 1 and 7 is allowable for at least the reason that the cited prior art taking singly or in-combination fail to teaches or suggest the claimed features of “**a register-exchange network for receiving said decision bits of said 2^{K-1} states from said add-compare-select module and generating decision vectors of survivor paths leading to said 2^{K-1} states at instant i according to said decision bits of said 2^{K-1} states from instant $i-L$ to instant i , wherein said decision vectors of said 2^{K-1} states are output every L iterations and each of said decision vectors has a length of L bits; and a trace-back unit for**

storing said decision vectors of said 2^{K-1} states and finding a global survivor path sequence by following said decision vectors back from the best state at instant $i-L$, such that L decoded bits are output every L iterations.” as recited in claim 1 and 7.

The Office Action indicates in pages 2-3 that the survivor memory unit of claim 1 and 7 is disclosed by the combination of *Azadet* in view of *Hatakeyama*. Applicant respectfully disagrees. In this regard, *Azadet* merely teaches a survivor memory unit to track the survivor paths. (see paragraph [0041] of *Azadet*) Neither *Azadet* nor any cited other cited reference properly teaches or suggests the limitation that “a register-exchange network for receiving **decision bits** of 2^{K-1} states and generating decision vectors of survivor paths leading to said 2^{K-1} states at instant i **according to said decision bits of said 2^{K-1} states from instant $i-L$ to instant i , said decision vectors of said 2^{K-1} states are output every L iterations, and each of said decision vectors has a length of L bits,**” as expressly recited in independent claims 1 and 7.

The Office Action further asserted “applicant has not disclosed that selecting values of 2^{k-2} local winner states selected from 2^{k-1} states provides an advantage, is used for a particular purpose, or solves a stated problem.” (Office Action page 3) Applicant respectfully disagrees with Examiner’s assertion since that the claimed invention could take advantage to use 2^{K-1} . As stated on page 10, lines 18-19 of the original application, “according to the invention, the trellis diagram for the rate $1/n$ encoder with a constraint length of K is organized in a butterfly structure.” In addition, the application on page 12, lines 9-10 states “the number of necessary ACS unit is equal to half the number of total states, that is, $P=2^{k-2}$.” Furthermore, none of the cited prior art teach decision vectors of

said 2^{K-1} states are **output every L iterations**, and **each of said decision vectors has a length of L bits** with the instant presented claimed structure. Thus, even if the references could be properly combined, the resulting combination still does not disclose or properly suggest all features of claims 1 and 7. For at least this reason, the rejection should be withdrawn.

Response To Rejection of Claims 2, 4, 5, 8, 10, 11, 13 & 14

Because independent claims 1 and 7 are allowable over the prior art of record, their dependent claims 2, 4, 5, 8, 10, 11, 13 and 14 are allowable as a matter of law, for at least the reason that these dependent claims contain all features/elements/steps of their respective independent claim 1 and 7. *In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988).

CONCLUSION

In light of the foregoing amendments and for at least the reasons set forth above, Applicant respectfully submits that all objections and/or rejections have been traversed, rendered moot, and/or accommodated, and that the now pending claims 1-14 are in condition for allowance. Favorable reconsideration and allowance of the present application and all pending claims are hereby courteously requested.

If, in the opinion of the Examiner, a telephonic conference would expedite the examination of this matter, the Examiner is invited to call the undersigned agent at (770) 933-9500.

Respectfully submitted,

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